Voice/Fax NMs

Voice NMs and Voice/Fax VICs

This section describes the following voice network modules and voice/fax interface cards:

- NM-1V
- NM-2V
- VIC-2FXO
- VIC-2FXS
- VIC-2E/M
- VIC-2BRI-S/T-TE

Table 18-339: Platform Support and Minimum IOS Release

Product Number	Cisco 2600	Cisco 3620/40	Cisco 3660
NM-1V	11.3(2)XA	11.3T	12.0(5)T
NM-2V	11.3(2)XA	11.3T	12.0(5)T

The Voice/Fax network modules for the Cisco 2600/3600 series enable voice and fax traffic to be routed over either an IP or Frame Relay network. The Voice/Fax network modules slide into the 2600/3600 series network module slots and support either one or two voice interface card (VIC) slots. The VICs are daughter cards that slide into the Voice/Fax network modules and provide the interface to the telephony equipment. Just as the Cisco WAN interface cards (WIC) can be swapped with other WICs, the Cisco VICs can be deployed interchangeably with other VICs.

Analog VICs currently available include a two-port foreign exchange station (FXS), foreign exchange office (FXO), and E/M analog interface cards. Also available is the two-port digital ISDN User Side Basic Rate Interface (BRI) VIC. A Cisco 2600 and 3620 can support one Voice/Fax network module that contains up to two VICs, while a Cisco 3640 can support up to three Voice/Fax network modules with up to a total of six VICs. The Cisco 3660 can support up to six Voice/Fax network modules with up to a total of 12 VICs. Therefore, the maximum densities currently available are four Voice/Fax ports for the Cisco 2600 and 3620, 12 Voice/Fax ports on the 3640, and 24 Voice/Fax ports on the 3660.

The voice/fax network module supports both Voice over IP, and Voice over Frame Relay applications, when used in the Cisco 2600 or 3600 series. The benefit of Voice/Fax over IP (VoIP) is that it is transport independent, because Layer 3 IP traffic can travel over any Layer 1 or Layer 2 media including: leased lines, ISDN, serial connections, Frame-Relay, Ethernet, Token Ring, and ATM. Using a router based solution for VoIP traffic reduces management costs, minimizes latency, has extremely low failure rates, and compares favorably with most other VoIP vendors PC-based solutions, who can't complete with Cisco's lower call latency. The Cisco Voice/Fax modules are H.323 compatible, and are interoperable with Microsoft NetMeeting and LAN-based I/P Telephony solutions. They also support ITU standards G.729 and G.711 which allow near toll-quality voice at 8kbps with G.729 enabled. Voice/Fax over Frame Relay (VoFR) may be appealing to users with homologous Frame Relay networks who wish to eliminate the overhead of IP on the WAN.

Also available for end-to-end voice management solutions is the Cisco Voice Manager. It empowers network administrators to install, control and lower the overall cost of owning corporate/enterprise voice networks built on VoIP technology by enabling call quality management and call detail reporting. Built to scale, including an embedded web server, an SQL database, and completely JAVA based, it is a web-based network management application that delivers easy-to-use yet powerful solutions to configure, monitor and diagnose voice-over-IP (VoIP) networks. Cisco Voice Manager automatically detects voice supported products, includes tools to troubleshoot network problems, and provides valuable mandatory call history information. For more details refer to Cisco Voice Manager documentation available on the web.

You need both a voice network module, a voice interface card, and an IOS Plus feature set for a voice connection. You can install one VIC (providing two voice ports) in a one-slot voice network module, and two VICs (four voice ports) in a two-slot module. The VIC-2BRI-S/T-TE provides four voice channels in a single VIC and must be installed in an NM-2V to use all four voice channels (installing the VIC-2BRI in an NM-1V will enable only two of the four voice channels). The VIC-

2BRI-S/T-TE may be installed in slot 0 of the NM-2V with another analog VIC installed in slot 1, but only two of the BRI voice channels will be active in this configuration. At least one other network module or WAN interface card must be installed in the router to provide the connection to the IP LAN or WAN.

Voice/Fax network modules convert telephone voice signals into a form that can be transmitted over an IP or Frame Relay network, and have no connectors. Voice interface cards provide the connection directly to telephone equipment (analog phones, analog fax machines, key systems, or PBX/PABXs) or to a PSTN (Public Switched Telephone Network). Refer to the Voice/Fax Data Sheet for a description of which VICs is appropriate for your desired connection.

Table 18-340: Voice/Fax Network Module and Voice Interface Card Specifications

Description	Specification
NM-1V	
Description	One voice/fax interface card slot network module
Spare	NM-1V=
FCC Specifications	FCC Class B device
MTBF	946,423 hours
Requires one VIC	VIC-2FXS, VIC-2FXO, VIC-2FXO-EU, VIC-2FXO-M3, VIC-2E/M, VIC-2BRI-S/T-TE
NM-2V	
Description	Two voice/fax interface card slot network modules
Spare	NM-2V=
FCC Specifications	FCC Class B device
MTBF	755,717 hours
Requires at least One VIC (max. of two)	VIC-2FXS, VIC-2FXO, VIC-2FXO-EU, VIC-2FXO-M3, VIC-2E/M, VIC-2BRI-S/T-TE
VIC-2FXS	
Description	Two-port FXS voice/fax interface card
Interface Type	Foreign exchange station
Compliance	FCC Class B, CE
Safety Conformance	UL 1950
Spare	VIC-2FXS=
Address Signaling Format	In-band DTMF Out-of-band pulse (10-20 pps)
Signaling Formats	Loop Start, Ground Start
Ringing Tone	Configurable for different country requirements
Ringing Voltages	<45 Vrms at 5 REN at 25 Hz (configurable)
Ringing Frequencies	20 Hz, 50 Hz
Physical Connector	RJ-11
Number of connectors/Ports	Two
MTBF	2,248,909 hr
VIC-2FXO[1]	
Description	Two-port Voice/Fax interface card
Interface Type	Foreign Exchange Office
Compliance	FCC Class B, CE
Safety Conformance	UL 1950
Spare	VIC-2FXO=
Address Signaling Format	In-band DTMF Out-of-band pulse (10-20 pps)
Signaling Formats	Loop Start, Ground Start
Tone Disconnect Supervision	Call disconnect on progress tone of less the 600 Hz
Power Interrupt Disconnect	Call disconnect on power interrupt of > 600 msec
Physical Connector	RJ-11
Number of connectors/Ports	Two
MTBF	2,302,609 hr

Description	Specification
VIC-2E/M	
Description	Two-port E&M Voice/Fax interface card
Interface Type	Used for PBX trunking
Compliance	FCC Class B, CE
Safety Conformance	UL 1950
Spare	VIC-2E/M=
Address Signaling Formats	In-band DTMF Out-of-band pulse (10-20 pps)
Signaling Formats	Immediate, delay dial, wink-start
Signaling Types	Type I,II,III, and V
E-Lead Current Limit	100 mA
M-Lead Sensitivity	>3 mA
Pulse Distortion	<2 percent
Physical Connector	Two wire/Four wire
Number of Connectors/Ports	Two
MTBF	1,943,521 hr

1. The VIC-2FXO is approved for off-premise connections in the U.S., Canada, Mexico, Hong Kong, and Malaysia. The VIC-2FXO-EU is approved for several European countries (refer to Overview for Voice/Fax Network Modules for the Cisco 2600 and 3600 Series routers for specific country information). The VIC-2FXO-M3 is approved for connections in Australia. Cisco continues to obtain approval in countries throughout the world for off-premise connectivity.

Table 18-341: Cisco Interface Cards (VICs) Applications

VIC Type	Applications
VIC-2FXS	Used to connect directly to analog phone and fax machines
VIC-2FXO	Used to connect to a PBX or key system, and provide off-premise connections
VIC-2E/M	Used to connect to a PBX or key system trunk lines

Figure 18-163: One-Slot Voice Network Module - NM-1V

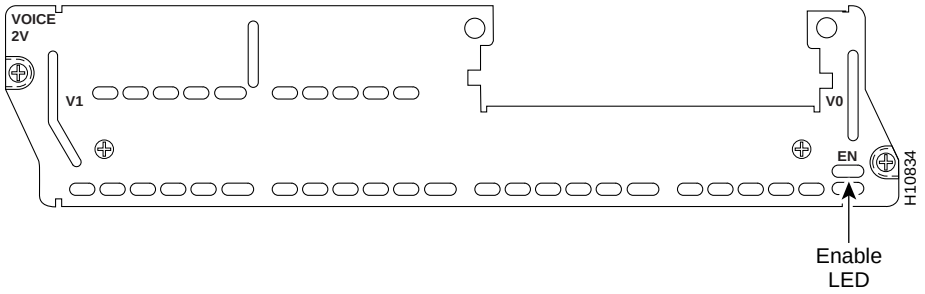


Figure 18-164: Two-Slot Voice Network Module, NM-2V

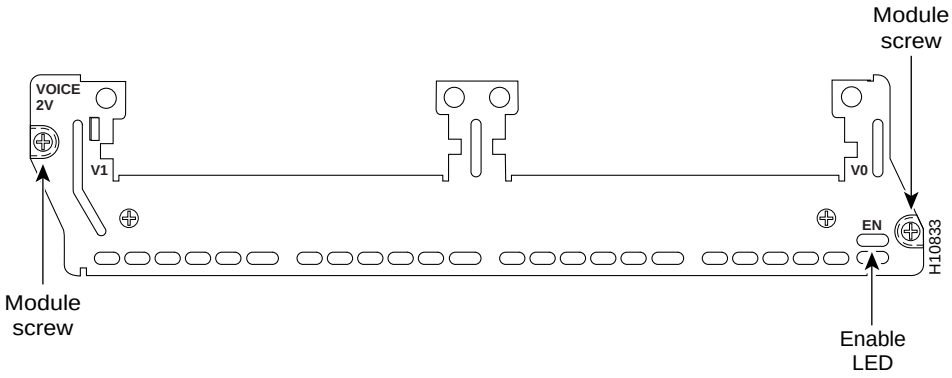
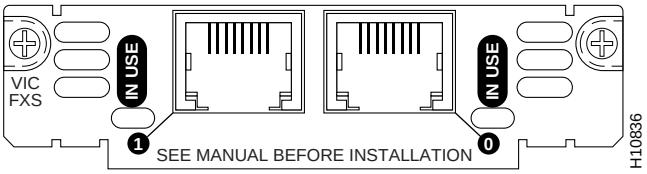
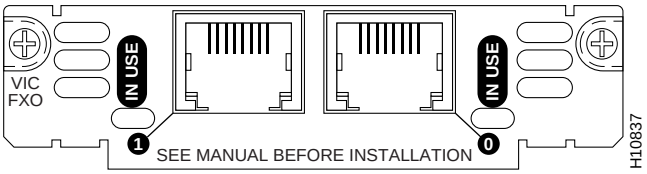


Figure 18-165: Voice Interface Card with FXS Interface, VIC-2FXS



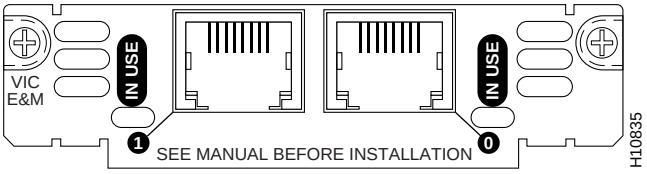
An FXS (foreign exchange station) interface connects directly to a standard telephone, fax machine, or similar device. This interface supplies ringing voltage, dial tone, and so on to the station. Ports on this interface card are color-coded gray. Use a standard RJ-11 modular telephone cable to connect this interface to a telephone or fax machine

Figure 18-166: Voice Interface Card with FXO Interface, VIC-2FXO



An FXO (foreign exchange office) interface connects local calls to a central office or PBX. This is the interface a standard telephone provides. Ports on this interface card are color-coded pink. Use a standard RJ-11 modular telephone cable to connect this interface to the public switched telephone network or PBX through a telephone wall outlet

Figure 18-167: Voice Interface Card with E&M Interface, VIC-2E&M



The two port E&M voice/fax interface card supports 2- and 4-wire interfaces and is typically used for connecting to the trunk side of the PBX for PBX-to-PBX connections. Use a standard RJ-11 modular telephone cable to connect this interface to the PBX or PABX.

Two-Port BRI Voice/Fax Interface Card (VIC) for 2600 and 3600

This new voice interface is popular in many European countries and some Asian, Pacific Rim, North American and South American countries. Customers with existing BRI network side interfaces on their PBX/PABXs will be able to now connect to 3600 and 2600 series router gateways using this interface. This will enable them to begin taking advantage of toll-bypass along with other Voice over Packet features. In addition, this new interface provides customers with the ability to connect directly to the PSTN using BRI leased connections which are widely available throughout countries in Europe along with parts of Asia, Japan, South America, US and Canada.

The VIC-2BRI-S/T-TE connects directly to PSTNs and PBX/PABXs supporting both on-premise and off-premise connections. The VIC-2BRI-S/T-TE is a two port ISDN, S/T, User Side, Basic Rate Interface (BRI) Voice Interface Card (VIC). This VIC supports a total of four voice channels in a single VIC via two RJ-45 physical ports. This VIC installs into either an NM-2V (for support of all four voice channels) or an NM-1V (for support of two voice channels).

The VIC-2BRI-S/T-TE includes the following features

- Up to four digital voice channels in a single VIC
- Connectivity to both PSTN and PBX/PABX using a single VIC
- Provides connectivity for widely distributed BRI interfaces throughout Europe
- Supports DID and Caller ID

Figure 18-168: Two-Port BRI Voice/Fax Interface Card (VIC) for 2600 and 3600

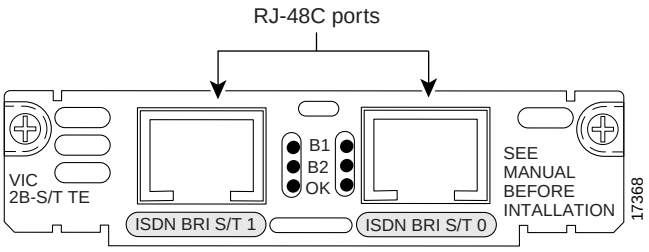


Table 18-342: VIC-2BRI-S/T-TE

Cisco IOS Requirement	12.0(3)T or later
Cisco Part Number	800-03803-01
Compliance	FCC Part 68, CS03, CTR3, TS-031, JATE Green Book
Safety Conformance	UL1950, CAN/CSA-C22.2, EN60950, IEC 950
Spare	VIC-2BRI-S/T-TE=
ITU Compliance	ITU-T Q.920, Q.921, Q.930, Q.931
Interface	Four Wire User Side S/T
ISDN Digital Access	Basic Rate Interface (BRI) 2B+D
Physical Connector	RJ-45
Number of Connectors/Ports	Two
MTBF	2,951,544 hours